

within the œsophagus. It must be admitted, however, that the figures accompanying v. Linstow's account are decidedly confusing, and it is not improbable that a failure to recognize the manner in which the entire jaws fold down, like the blades of a penknife, into the œsophagus, has been at the root of the matter. The condition in the present species makes it almost certain that the action of the jaws will be found to be the same in *C. viviparus*.

One other point remains to be noticed. It does not seem at all clear that the "kegelförmige Spitzen" of v. Linstow are the same as the "papilles céphaliques" of Gedoelst, as the latter supposes, since the former not only figures them as being *within* the six "Haken," but expressly states that this is the case. The fact that both authors describe and figure six outwardly directed hooks on the lips in addition to what I have termed the jaws ("Flügel" of v. Linstow, "lames pectinées" of Gedoelst) seems to indicate that they are both referring to the same structure. The presence of the "Spitzen," however, seems doubtful, and one is rather led to believe that v. Linstow's account, in this particular, may be erroneous, possibly as the result of a misinterpretation of the structure of the jaws. The present species apparently possesses neither the "Spitzen" nor the "Haken," but it occurs to me as not impossible that the incurved terminal teeth of the jaws, when partly, but not wholly, everted, might, by crossing each other, give rise to the appearance of six forwardly-directed points occupying the centre of the oral aperture.

The writer's thanks are again due to Dr. G. A. K. Marshall, of the Imperial Bureau of Entomology, for the opportunity of examining this material, which was collected by Mr. T. R. Hubback.

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#### XIV.—*Descriptions and Records of Bees.*—LXXXVI.

By T. D. A. COCKERELL, University of Colorado.

THE Indian bees recorded below were all received from Mr. T. V. Ramakrishna Ayyar.

*Crocisa ramakrishnæ*, Cockerell.

Bangalore, at flowers of *Cosmos*, Aug. 25 (T. B. F.);

Taliparamba, Malabar District, Sept. 30–Oct. 4 (*Ramakrishna Ayyar*).

*Crocisa histrio* (Fabricius).

Beeravalli-Bellary District (*C. N.*). India.

*Crocisa macraspis*, sp. n.

♂.—Length about 10 mm.

Robust, black, with clear white markings (hair-patches); anterior wings fuliginous; scutellum unusually large, the apical incision broad and open, but with straight sides; no white hair on scutellum, but a large white tuft beneath the incision; thoracic markings with the usual pattern, but median line reduced to a rather small elongate mark, stripe above tegulæ reduced to anterior portion, median and posterior mesothoracic spots large and rounded; pleura with a very broad median transverse band, narrowly connected anteriorly with a large patch beneath wings, and an isolated round spot ventrally; anterior and middle tibiæ covered with white hair on outer side, hind tibiæ with about the basal half white, the white divided from the black diagonally; hind basitarsi with a small tuft of white near base; head with white hair; white on abdomen reduced to lateral patches; on first segment shaped much like a bird's head and neck (reversed), the inner projection broad and obtuse, but narrowing toward end; marks on the other segments broader than long. The hind femora have a rounded keel beneath, but no tooth.

Saidapet farm, Sept. 6, 1907, on flower (*T. V. R.*). The locality is in Madras.

Differs from *C. ramosa* by the much larger scutellum, abdominal markings, &c.; the scutellum is also quite different from that of *C. ramosella*. Compared with *C. reductula*, it is larger and broader, with more white hair on tibiæ.

*Crocisa chionotricha*, sp. n.

♀.—Length about 9 mm.

Looks like *C. ramosella*, Ckll., but is smaller, with the markings pure white (instead of creamy white), scutellum with white hair above the notch, and no long stripe of white hair above the tegulæ. Anterior wings fuliginous; head with white hair; markings of thorax as usual, anterior median band reaching level of anterior end of middle pair of spots, stripe above tegulæ reduced to a large cuneiform mark anteriorly; posterior mesothoracic spots oblique; pleura marked nearly as in *C. macraspis*; scutellum deeply incised, W-like, the points acute; middle tibiæ with rather more, and hind tibiæ with rather less, than basal half covered with

white hair; abdominal markings reduced to lateral patches, those on first segment shaped like a boot, those on second curved upward and broadly emarginate laterally (shaped like a human mandible), the others broader than long.

Coimbatore, S. India, the type Feb. 7, 1913 (*T. V. R.*); another Jan. 1, 1913 (*A. G. R.*).

In Friese's tables this runs to *C. ramosa*, but the scutellum is quite different.

*Crocisa reducta*, Cockerell.

Described from Singapore, but the same species comes from the Island of Penang (*Baker*).

The posterior and lateral mesothoracic markings have much the outline of the stem and bowl of a clay pipe.

*Crocisa crucifera*, Cockerell.

Described from the Philippine Is., but I cannot separate one from Sandakan, Borneo (*Baker*, 9966).

*Anthophora violacea*, Lepeletier.

Parlakimedi, Nayaranapuram, Ganjam District, India, May 1914 (*Ramakrishna Ayyar*). ♀.

*Anthophora cingulifera*, Cockerell.

Rockhill, 3500 ft., Coorg, Sidapur, April 1913 (*T. V. R.*). ♀.

*Anthophora confusa*, Smith.

Pulney Hills, S. India, May 1917 (*P. S. Nathan*). ♀.

*Anthophora zonata* (Linnæus).

Rockhill, 3500 ft., Coorg, Sidapur, April 1913 (*T. V. R.*). ♀.

*Cælixys apicata*, Smith.

Coimbatore, India, January, May, October, November (*T. V. R.*, *A. G. R.*); Devanakonda, Kurnool District, August (*Ponniak*). All females.

*Cælixys dormitans*, Cockerell.

Coimbatore, February, on wheat-ear (*P. S.*); Yemmanur, Bellary District, December (*Ponniak*). Females.

The female of *C. dormitans* differs from that of *C. apicata* in the venation, the first recurrent nervure meeting the first transverso-cubital. In other respects they are so much alike that one hesitates to regard them as distinct. The type of *C. apicata* was a female from Northern India, in the Baly collection. My knowledge of the venation (not mentioned in Smith's description) comes from a female from "India," from F. Smith's collection. The group of species or races

related to *C. decipiens*, Spinola, presents difficulties which can only be overcome in the presence of more material from various localities.

*Cælixys sexmaculata*, Cameron.

Coimbatore, May 5 (*T. V. R.*); Devanakonda, Aug. 15 (*T. V. R.*). Females.

According to Bingham's table this should have "tarsi with golden pubescence," a character derived from Cameron's description. The specimens before me have pale ferruginous hair on the inner side of the tarsi only; the hind basitarsi have white hair on the outer surface. No doubt Cameron referred to this condition. In the case of *C. fulvitaris*, which he says is near to *sexmaculata*, he definitely states that the rufo-fulvous hair is on the under side of the tarsi.

*Cælixys pachyrhina*, sp. n.

♀.—Length about 13.5 mm., anterior wing 8 mm.

Black, including legs and tegulæ, except that the anterior legs, especially the tibiæ, are rufescent anteriorly, and the middle legs are also partly rufescent; pubescence forming pure white markings, the white areas including sides of face, cheeks, upper part of pleura, patch before tegulæ, spot behind tegulæ, sides of metathorax, linear bands on hind margins of abdominal segments, expanding laterally, broad longitudinal bands on each side of first segment, base and middle of first ventral segment, and broad interrupted bands on ventral segments 2 to 4; clypeus very prominent and very strongly keeled (roof-like), very convex in lateral profile; a broad flattened longitudinal elevation from the front to the upper margin of clypeus; mesothorax strongly punctured, with a median anterior patch of slightly yellowish pubescence, and there are two yellowish-white spots at base of scutellum; scutellum rugoso-punctate all over, very broadly rounded; axillar spines prominent. Wings pale fuliginous; first r. n. joining second s. m. as far from base as the second from apex; hind spurs pale dull reddish. Abdomen strongly punctured; last dorsal segment elongated, shining, the narrow apical part strongly keeled; last ventral very narrow, with entire margins, extending far beyond dorsal, and curved downward, its basal margins (under the dorsal plate) fringed with white hair.

Devanakonda, Kurnool District, India, Aug. 15, 1913 (*T. V. R.*).

In Bingham's table runs to *C. confusa*, Smith, from which it is easily known by the structure of clypeus and front. A

really related species, with darker wings and stout axillar spines, is *C. philippensis*, Bingham, from the Philippine Is.

*Cælioxy's ramakrishnæ*, sp. n.

♂.—Length slightly over 10 mm.

Black, including legs and tegulæ; eyes greenish, with abundant short hair; face and clypeus flat, covered with white hair; cheeks with a broad depressed sharply defined band, filled with snow-white hair; vertex with large punctures; antennæ black; mesothorax and scutellum with very large punctures, not covering the whole surface; no hair-spots on mesothorax; scutellum broadly rounded posteriorly; axillar spines large; pleura not densely hairy, but a white line runs down from the tubercles; tegulæ black. Wings dilute fuliginous, hyaline basally; second sub-marginal cell receiving recurrent nervures almost equally far from base and apex; anterior coxæ spined. Abdomen polished, strongly but sparsely punctured, hind margins of segments with linear white hair-bands, broadening laterally; sides of first segment with only a rather thin and narrow longitudinal band; fifth segment with a small spine on each side; sixth (terminal) segment with long and slender lateral spines at base, and four apical ones, the lowermost long and slender. The fourth ventral segment is entire. Hind spurs dark reddish.

Coimbatore, India, February (*T. V. R.*).

Runs in Bingham's table to *C. confusa*, Smith, but appears to differ by the longer axillar spines, more strongly punctured abdomen, and the very small (scarcely noticeable), white hair-marks at base of scutellum. Smith described the female, and Bingham only gives two lines of description for male *confusa*, so exact comparisons cannot be made. Meade-Waldo, on comparing types, found that Cameron's *C. tenuilineata* from Simla was *confusa*. This differs from our insect by the dense hair on base and apex of mesopleura, and the emarginate scutellum. No doubt the two insects are allied, but I believe them to be distinct.

*Nomioides patruelis*, sp. n.

♀.—Length about 4 mm.

Head circular seen from in front, dark bluish green; clypeus, a small round supraclypeal mark, labrum, mandibles (except the ferruginous apical part), and the long scape in front, all pale yellow; flagellum pale yellowish ferruginous beneath, reddish brown above; mesothorax bright green, shining; pleura dark green; metathorax black, the base finely rugose; upper border of prothorax, tubercles, line

bordering axillæ, two large eye-shaped areas on scutellum, and postscutellum, all pale yellow. Wings hyaline, with extremely pale nervures and stigma; first r. n. meeting second t. c.; second s. m. narrowed practically to a point above. Legs very dark brown basally, the apices of the femora and the tibiæ and tarsi wholly yellow. Abdomen cream-colored, the first segment basally suffused with reddish, with a dark dot on each side, and its apical region with a very broad well-defined black band, the margin narrowly reddish; segments 2 and 3 with arched black bands, leaving a broad pale reddish area posteriorly except at sides; segments 4 and 5 with the bands broken into a large median spot and a band on each side; venter suffused with dusky reddish.

Shevaroy's-Yergand, India, 4500 ft., April 21-May 13 (Y. R.).

Very similar to *N. parvula*, Fabr. (*pulchella*, Sch., *cerea*, Nurse), but easily separated by the broader head, green eyes, two marks on scutellum, and heavy abdominal banding.

*Stelis tuberculata*, sp. n.

♀.—Length about 6 mm.

Black, with creamy-white markings as follows: band along each side of clypeus (and sometimes whole upper part), broad band on each side of face (narrowing above, ending as a free finger-like projection close to upper end of each eye). stripe on upper part of cheeks (away from eye), interrupted band on occiput, small spot on tubercles, L-shaped mark at lateral anterior corners of mesothorax, spot on axillæ, interrupted band on scutellum, under side of anterior and middle femora, and short stripe on hind ones, stripe on anterior tibiæ in front (the knees are ferruginous), large mark on each side of first abdominal segment, very broadly interrupted band on second segment, less broadly interrupted one on third, narrowly interrupted band on fourth and fifth, but these also interrupted laterally. Mandibles with a yellowish spot near base, and a large red one subapically; lower part of clypeus with two prominent tubercles; flagellum dark red beneath; tegulæ piceous, with a pallid mark in front. Wings hyaline, with a dusky apical cloud; second r. n. going beyond end of second s. m. Mesothorax dull, very closely and finely punctured. Abdomen shining, with distinct punctures; pulvilli small, but distinct; anterior coxæ with a white apical spot.

Coorg Sanivarsandai, Hansey Estate, India, 4000 ft., on coffee, April 29-30, 1913 (T. V. R.), type. Another

is marked Coorg Sidapur, Rockhill, 3500 ft., April 23-26, 1919 (*T. V. R.*).

Readily known from *S. parvula*, Cam., by the tuberculate clypeus.

*Lithurgus australior*, Cockerell.

Described from the male. A female is from Coimbatore, India, Dec, 24, 1918 (*Ramakrishna Ayyar*). It is about 12.5 mm. long, and runs in Friese's table nearest to the Australian *L. dentipes*, but the structure of the face is different. It is very near *L. scabrosus* (Smith), but the white hair-bands on abdomen are broader. The ventral scopa is brownish black.

*Ceratina binghami*, Cockerell.

Salem, India, Dec. 2-18, 1914 (*Ramakrishna Ayyar*).

*Nomia iridescens*, Smith.

Bangalore, India, May (*T. V. R.*).

*Nomia histrionica*, sp. n.

♂.—Length about 10.5 mm.

Running in Bingham's table to *N. curvipes*, from which it differs conspicuously in the mesothorax, which shows the black densely and minutely punctured surface, with a conspicuous band of ochreous hair all around the margins; in the smaller scutellum, the creamy-white hair of metathorax, the ivory-colour (not greenish or reddish) abdominal bands, the hair fringing sixth abdominal segment white, and the clear red (instead of black) basal part of hind femora. In my table in *Trans. Amer. Ent. Soc.* xxxvii. p. 233, it runs to *N. aureohirta*, Cam., to which it is also closely allied, differing by the paler hair of face, the flagellum chestnut-red beneath, the mesothorax as described above, the scutellum with the densely punctured surface exposed, the broad tegumentary abdominal bands bare, and the hind tibiae with a large black spot. The shape of the hind tibiae is also highly characteristic; the anterior margin is undulating, so that the whole tibia resembles the head of a deer, the apical lamina representing the ear. The abdomen has a well-developed subapical dentiform process. It is also related to *N. eburnigera*, Ckll., but the face and abdomen are broader, and the hind tibia is different. It is quite distinct from *N. fulvohirta*, Cam., and *N. varipes*, Cam., from Allahabad.

Koilpaty, Tinnevely, India, Dec. 3, 1906 (*T. V. R.*).

*Andronicus cylindricus*, Cresson.

Boulder, Colorado, May 14, 1919, ♂ (*Katherine Fitzgerald*).